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RESEARCH ARTICLE.....

Effect of level of Jersey inheritance in crossbred cattle on subsequent milk yield

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ABSTRACT..... This study was conducted to see the effect of level of Jersey inheritance in cross bred cattle on subsequent milk production. The data subsequent milk production of Jersey (J) and Red Sindhi (RS) cows maintained at dairy farm, Sundersan School of Animal Husbandry and Dairying, Sam Higginbottom Institute of Agriculture, Technology and Sciences Allahabad were recorded form the history sheets of the animals maintained during this period (1930-1962) for the basis of this study. Jersey Sindhi crosses were divided into 4 genetic-groups consisting of 17, 11, 51 and 24 animals in G_1 (1/2J X 1/2RS), G_2 (3/8 J X 5/8 RS), G_3 (1/4 J X 3/4RS), G_4 (1/8J X 7/8 RS). The effects of Jersey inheritance on subsequent milk production were recorded. Dry period has a non-significant effect on subsequent milk yield in all crosses except in 3/8J X 5/8 RS crosses a significant effect was observed on milk yield only. Therefore, due emphasis should be given to the crosses having exotic inheritance 62.5 per cent for selection and cross breeding.

KEY WORDS..... Cross bred, Jersey, Red sindhi, Lactation

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INTRODUCTION.....

More production of milk through the cross breeding programme is an interested topic in recent time. Rémond *et al.* (1997) and Andersen *et al.* (2005) reported 305-day lactation and 60 days of rest or dry period is ideal for the dairy animals, if we reduced this causes the reduction in the milk yield. Chopra and Bhatnagar (1973) reported that average service period, lactation length and milk yield in F1 crosses of Brownswiss cross was 102 days and 3018 kg, respectively. Lactation milk yield of HF × Deoni crossbred cows was recorded as 1661.35 ± 15.17 (Wondifraw *et al.*, 2013).The milk yield per day of calving interval of 4.68±0.81 kg and 5.104 ± 0.129 kg in Jersey and Jersey x Red-Sindhi cows, respectively (Das *et al.*, 2002). Birhanu *et al.* (2015) reportd daily milk yield and total lactation milk 5.18±0.62 lit. and 2040.19±256.01 lit. in Ethiopian Boran and their crosses with Holstein Friesian cows. Tomer and Balani (1973) reported that there was no significant correlation between length of dry period and milk yield. Hassan and Khan (2013) recorded a average 305day milk yield for crossbreds was 1613±49.03 kg.The length of preceding

dry period had a significant effect on lactation yield.Verma and Thakur (2013) reported a 6.78±0.17 kg/day and 5.61±0.16 kg/day for average daily milk yield of lactation length 136 Red Sindhi x Jersey crossbred cows. Taneja *et al*. (1979) reported that there wasno increase in milk production above the above 50 per cent with the exotic inheritance. Dry periods of 30 d or fewer resulted in large reductions in subsequent lactation production (Kuhn *et al.*, 2007). Blat and Patro (1978) reported that the longer preceding dry period was not favourable for higher milk yield and lactation length. Nehra *et al.* (1978) analyzed 1050 records and reported that overall lactation length and calving interval in Holstein and Sahiwal crosses average at 287.02 ± 3.01 and 390.36 ± 7.28 days. 50 per cent Zebu x Friesian group produced significantly more milk per lactation (2721.10 ± 87.36 kg) compared to the 25 per cent and 37.5 per cent groups (Ahmed *et al*., 2007). Basu and Ghei (1981) reported that the correlation co-efficients were highly significant within years, seasons and lactation between dry period and milk yield, lactation length, service period and calving interval when male calves were born the gestation period of Red Sindhi cows was significantly higher by three to ten days then when female calves were born in the three different calving season. A study in North Showa zone indicates that 50 per cent cross breeds (1511.5 L) produce more amount of milk than local breeds (457.89 L) per lactation (Mulugeta and Belayeneh, 2013). Madsen (1976) worked in Banglore and reported the milk production in 305 days for Improved local, Red Dane × improved local and Red Dan × Red Sindhi was 2204. 2661 3180 lit., respectively.

Dhumal *et al*. (1989) made a study on 161 J x RK crossbred cows and reported mean lactation yield as 1934 kg. and lactation length as 315 days. Non-significant correlation was observed between lactation yield and length with dry period. Rege (1998) analyzed 80 data sets of crossbred dairy cattle and reported that average milk yield of F_1 crosses between Bostaurusand zebuas 2195±30.1 kg in an average lactation length of 309±3.6 days, indicating crossbreds above 50 per cent exotic blood did not perform superior than the F_1. Shelter and Govindaiah (1999) reported that the season of calving influenced significantly both the standard and total lactation milk yield. Pramanik *et al*. (2000) reported that season of calving on 300 days lactation yields was highly significant in Jersey x Harayana and Holestein Friesian x Harayana cross breeds.

RESEARCH METHODS.....

The data on dry period of Jersey (J) and Red Sindhi (RS) cows maintained at dairy farm, Sundersan School of Animal Husbandry and Dairying, Allahabad were recorded form the history sheets of the animals maintained during this period (1930-1962) for the basis of this study. The heritability of trait was estimated by paternal half sib correlation method.Jersey Sindhi crosses were divided into 4 genetic-groups consisting of 17, 11, 51 and 24 animals in G_1 (1/2J X 1/2RS), G_2 (3/8 J X 5/8 RS), G_3 (1/4 J X 3/4 RS), G_4 (1/8J X 7/8 RS). The effect of Jersey inheritance on subsequent milk yield was recordrd. Following were the parameters for collection of data in this study.

Genetic group (G) - G_1 (1/2 J x 1/2 RS), G_2 (3/8 J x 5/8 RS), G_3 (1/4 J x 3/4 RS) and G_4 (1/8 J x 7/8 RS)

- Dry period (DP) groups (1/2 J x 1/2 RS) - DP_1 (50-60), DP_2 (61-70) and DP_3 (71-above)
- Dry period (DP) groups (3/8 J x 5/8 RS) - DP_1 (50-60), DP_2 (61-70) and DP_3 (71- above)
- Dry period (DP) groups (1/4 J x 3/4 RS) - DP_1 (50-60) DP_2 (61-70) and DP_3 (71- above)
- Dry period (DP) groups (1/8 J x 7/8 RS) - DP_1 (50-60), DP_2 (61-70) and DP_3 (71- above).

The data were subjected to statistical analysis using analysis of variance (ANOVA) technique (one way classification) as per method of Snedecor and Conhran (1994).

To find out the effect of Jersey inheritance ondry period and its effect on milk yield, fat yield and lactation length. The data were subjected to statistical analysis

Table A : Structure of analysis of variance (ANOVA)

Source of variation	d.f.	S.S	M.S.S.	F value		Result
				F. Cal	Table at 5%	
Genetic groups	n-1	SSG	VT	VT/VE	-	S/NS
Error	N-n	SSE	Ve		-	
Total	N-1					

S= Significant NS= Non-significant

using analysis of variance (ANOVA) technique (one way classification) as per method of Snedecor and Conhran (1967). Thus, the structure of analysis of variance (ANOVA) was as follows:

RESEARCH FINDINGS AND ANALYSIS.....

Effect of dry period (1/2 J X ½ RS, 3/8 J x 5/8 RS, 1/4 J x 3/4 RS, 1/8 J x 7/8 RS) on Subsequent milk yield of Jersey crosses were presented in the Tables 1-8.

From the perusal of data on milk yield on Jersey crosses contained in Table 1 and 2. It was noted that in general milk yield of cows ranged from 403.54-2837.86kg. However, the highest mean milk yield (2054.37kg.) of Jersey crosses was observed in cows $_3$.(71-ABOVE days) followed by1468.67 kg in cows of DP_1, (50-60 days) and (1256.48 kg) in cows of DP_2 (61-70 days) and the differences in these were found non-significant. In Previous studies of Holsteins (Funk *et al.*, 1987 and Kuhn *et al.*, 2000) and Jerseys (Kuhn *et al.*, 2007) result showed that lactation depends on parity and have generally found either no or only small interactions with parity. From the perusal of data on milk yield on Jersey crosses contained in Table 3 and 4. It was noted that in general milk yield of cows ranged from 730.45-3188.18 kg. However, the highest mean milk yield (2521.31kg) of Jersey crosses was observed in cows of DP_3. (71- above days) followed by 1425.21 kg in cows of DP_2, (61-70 days) and (1073.75 kg) in cows of DP_1(50-60 days) and the differences in these were found significant. From the perusal of data on milk yield on Jersey crosses contained in Table 5 and 6. It was noted that

Table 1 : Effect of dry period (1/2 J X ½ RS) on subsequent milk yield (kg) in Jersey crosses

Sr.No.	DP_1 (50 - 60)	DP_2 (61 – 70)	DP_3 (71 – Above)
1.	1034.59	1045.18	2374.13
2.	1759.27	2243.18	1979.81
3.	1687.79	1633.59	2837.86
4.	1032.18	403.54	1994.72
5.	2477.77	956.95	2369.28
6.	820.45	-	770.45
Mean	1468.67	1256.48	2054.37

Table 2 : ANOVA for data on subsequent milk yield according to dry period

Sr. No.	Sources of variation	d.f.	S.S.	M.S.S.	F.cal	F.tab p> n.05	Result
1.	Treatments	2	1929347.839	964673.919	2.110	3.74	NS
2.	Error	14	6400392.265	457170.873	-	-	
3.	Total	16	-	-	-	-	

NS= Non-significant

Table 3 : Effect of dry period (3/8 J X 5/8 RS) on subsequent milk yield (kg) inJersey crosses

Sr. No.	DP_1 (50 - 60)	DP_2 (61 – 70)	DP_3 (71 – above)
1.	1293.72	1054.68	2735.5
2.	1456.27	2388.95	1640.27
3.	730.43	1366.36	3188.18
4.	814.59	890.85	-
Mean	1073.75^{a}	1425.21^{ab}	2521.31^{b}

Similar alphabets indicate non- significant differences between values within the parameter.(DP_1 50-60 days) (DP_2 61-70 days) (DP_3 71-above)

Table 4 : ANOVA for data on subsequent milk yield according to dry period

Sr. No.	Sources of variation	d.f.	S.S.	M.S.S.	F.cal	F.tab p> n.05	Result
1.	Treatments	2	3776257.288	1888128.649	5.032	4.46	S
2.	Error	8	3001642.787	375205.347	-	-	
3.	Total	10	-	-	-	-	

S= Significant

Table 5 : Effect of dry period (1/4 J X 3/4 RS) on subsequent milk yield (kg) in Jersey crosses

Sr. No.	DP_1 (50 - 60)	DP_2 (61 – 70)	DP_3 (71 – above)
1.	635.40	1277	850.04
2.	965.90	1407.09	1021.45
3.	887.68	2557.59	2668.68
4.	2274.09	1902.95	1334.59
5.	1553.59	1834.90	1814.04
6.	1802.18	2584.54	2199
7.	1077.5	1924.5	1990.18
8.	2204.63	2290.81	1677.40
9.	2009.09	3090.81	2295.95
10.	2727	2553.54	2962.27
11.	1789.36	2182.18	1990.81
12.	1060.81	456.36	2019
13.	2386.18	1332.86	1668.95
14.	1181.40	-	2353.04
15.	1598.90	-	1049.54
16.	-	-	1909.27
17.	-	-	2068.18
18.	-	-	1109.77
19.	-	-	3051.59
20.	-	-	2270.95
21.	-	-	1299.31
22.	-	-	971.95
23.	-	-	1896.59
Mean	1605.586	1938.089	1846.636

Table 6 : **ANOVA for data on subsequent milk yield according to dry period**

Sr. No.	Sources of variation	d.f.	S.S.	M.S.S.	F.cal	F.tab p> n.05	Result
1.	Treatments	2	864836.602	432418.301	1.046	3.15	NS
2.	Error	48	19925263.038	415109.644	-	-	
3.	Total	50	-	-	-	-	

NS=Non-significant

Table 7: Effect of dry period (1/8 J X 7/8 RS) on subsequent milk yield (kg) in Jersey crosses

Sr. No.	DP_1 (50 - 60)	DP_2 (61 – 70)	DP_3 (71 – above)
1.	1590	961.13	2350.40
2.	5041.59	1875.36	1719.95
3.	1979.63	1632.36	1245.77
4.	770.90	2521.40	870.36
5.	1752.27	2379.5	600.36
6.	-	1364.27	913.86
7.	-	1984.90	1321.5
8.	-	-	2837.59
9.	-	-	1717.68
10.	-	-	959.63
11.	-	-	2731.36
12.	-	-	1696.68
Mean	2216.278	1816.985	1540.423

Table 8 : ANOVA for data on subsequent milk yield according to dry period

So. No.	Sources of variation	d.f.	S.S.	M.S.S.	F.cal	F.tab p> n.05	Result
1.	Treatments	2	1439129.67	719564.83	0.807	3.47	NS
2.	Error	21	18730055.37	891907.39	-	-	
3.	Total	23	-	-	-	-	

NS = Non-significant

in general milk yield of cows ranged from 456.36-3090.81 kg. However, the highest mean milk yield (1938.08 kg) of Jersey crosses was observed in cows of DP_2(61-70days), followed by 1846.63kg in cows of DP_3, (71-above days) and 1605.58 kg in cows of DP_1(50-60 days) and the differences in these were found non-significant. From the perusal of data on milk yield on Jersey crosses contained in Table 7 and 8. It was noted that in general milk yield of cows ranged from 600.36-2875.36 kg. However, the highest mean milk yield (2216.27 kg) of Jersey crosses was observed in cows of DP_1 (50-60 days), followed by 1816.985 kg in cows of DP_2, (61-70 days) and 1580.42 kg in cows of DP_3 (71-above days) and the differences in these were found non-significant.

Conclusoin :

Dry period has a non-significant effect on subsequent milk yield in all crosses except in 3/8J X 5/8 RS crosses a significant effect was observed on milk yield only. Therefore, due emphasis should be given to the crosses having exotic inheritance 62.5 per cent for selection and cross breeding.

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